$nD^0\pi^+$ and $pD^0\pi^0$. We expect the contributions from BaBar, Belle, LHCb, and forthcoming BelleII, SuperB, which are ideal places to further investigate the observed $X_c(3250)^0$ and the predicted $Y_c(3250)^+$ by the B decay.

Table 1 The boundary energies and decay widths of $X_c(3250)^0$ and $Y_c(3250)^+$. The cut-off Λ, boundary energy E and decay width Γ are in units of GeV, MeV and MeV, respectively

$X_c(3250)^0$ with $I=1$			$Y_c(3250)^+$ with $I=0$		
Λ	E	Γ	Λ	E	Γ
1.17	−3	121±18	3.30	−3	118±17
1.20	−7	111±17	3.60	−6	108±16
1.23	−13	105±16	4.20	−14	96±14
1.26	−22	100±15	4.80	−23	86±13
1.30	−35	92±14	5.70	−35	76±11
BaBar	−13	108±60	——	——	——

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1 - 14 Open-charm Radiative and Pionic Decays of Molecular Charmonium Y(4274)

He Jun

Recently the CDF Collaboration reported an explicit enhancement structure, Y(4274), with 3.1σ significance in the $J/\psi\varphi$ invariant mass spectrum[1]. Its mass and width are $M=[4274.4^{+8.4}_{-6.7}(\text{stat})\pm1.9(\text{syst})]$ MeV and $\Gamma=[32.3^{+21.9}_{-15.3}(\text{stat})\pm7.6(\text{syst})]$ MeV, respectively. The evidence of Y(4274) revealed by CDF not only has made the spectroscopy of charmonium-like states observed in B meson decays abundant, but also stimulated theorist's interest in revealing its underlying structure. Studying Y(4274) will improve our understanding to the essential mechanism resulting in these structures.

Since Y(4274) was observed in the $J/\psi\varphi$ invariant mass spectrum, we can conclude that the quantum number of Y(4274) are $I^G(J^{PC})=0^+(J^{++})$ with $J=0,1,2$ if Y(4274)→$J/\psi\varphi$ occurs via S-wave. If explaining Y(4274) as a candidate of charmonium, Y(4274) should be a P-wave state with the second radial excitation. In Ref. [2], the predicted total widthes of the second radial excitations of χ_{c0} and χ_{c1} are larger than the width of Y(4274). In addition, X(4350), which was observed in the $\gamma\gamma\to J/\psi\varphi$ process with mass $M=4350.6^{-5.1}_{+4.6}(\text{stat})\pm0.7(\text{syst})$ MeV and width $\Gamma=13^{+13}_{-9}(\text{stat})\pm4(\text{syst})$ MeV, was explained as the candidate of the second radial excitation of χ_{c2}, where the measured parameters of Y(4274) are different from those of X(4350). Thus, to some extent we can exclude P-wave charmonium explanation to Y(4274), which stimulates the discussion of Y(4274) as exotic state just presented in this work. The mass of Y(4274) is near the threshold of $D_sD_{s0}(2317)$, which is similar to the situations of Y(4140) and Y(3930) since Y(4140) and Y(3930) are assigned as molecular states of $D_s^*D_s^*$ and D^*D^*, respectively. Thus, it is natural to deduce that Y(4274) can be as an S-wave $D_sD_{s0}(2317)$ molecular charmonium.

Carrying out the dynamical calculation of the mass spectrum of Y(4274) is seen as an important approach to test whether Y(4274) is a molecular state. Furthermore, performing the study of the decay behavior of Y(4274) can provide crucial information to test this molecular assignment to Y(4274). Just considering the above reasons and the present theoretical research status of Y(4274), we investigate the open-charm radiative and pionic decays of Y(4274) as shown in Table 1, which includes the calculation of the branching ratios and the study of line shape of these decays using the covariant spectator theory[3].

Table 1 The radiative and pionic open-charm decay widths of Y(4274) with typical values of *h* and *Λ*

h	Λ (GeV)	Γ_γ(keV)	Γ_π(keV)
−1.60	1.35	0.049	0.29
−1.50	1.55	0.050	0.30
−1.40	1.85	0.050	0.29
−1.30	2.50	0.049	0.30

Our calculation indicates that the decay widths of Y(4274)$\rightarrow D_s^+ D_s^{*-} \gamma$ and Y(4274)$\rightarrow D_s^+ D_s^- \pi^0$ can reach up to 0.05 and 0.3 keV, respectively. In addition, the result of the line shape of the photon spectrum shows that there exists a very sharp peak near the large end point of photon energy. The line shape of the pion spectrum is similar to that of the photon spectrum, where we also find a very sharp peak near the large end point of pion energy. According to our calculation, we suggest further experiment to carry out the search for the open-charm radiative and pionic decays of Y(4274).

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1 - 15 Spin-flip Response Function of Finite Nuclei in a a Fully Self-consistent RPA Approach

Wen Peiwei and Cao Ligang

It is well-known that a better description of the spin-flip response, such as the magnetic dipole response and Gamow-Teller response shall enable more reliable predictions for neutral-current neutrino nucleus cross sections for supernova explosion[1] and β-decay half-lives of very neutron-rich nuclei. In this report, we study the spin-flip response of finite nuclei in a fully self-consistent Hartree-Fock plus random phase approximation within the SLy5 Skyrme parameter set[2−3]. We discuss the effect of J^2 terms and spin-orbit interaction on the response function. The J^2 terms are included/excluded both at the mean field and the excited state for self-consistency.

In the past, most of the existed Skyrme interactions, such as SIII and SLy4 parameter sets, have neglected the so-called J^2 terms or the spin-gradient term when one fits the Skyrme parameters. One reason is that it is difficult to include it in the ground state calculations of the deformed nuclei; On the other hand it vanishes for spin saturated systems where the spin density J is equal to zero. But those terms are included in RPA for the excited states calculations automatically; this breaks the self-consistency in the calculation[4]. As mentioned above, the J^2 terms vanish in the ground state calculation of spin-saturated nuclei, but those terms contribute to properties of ground state for spin-unsaturated nuclei, the J^2 terms also contribute to the response function of the finite nuclei, especially in spin-flip response, by acting as part of the particle-hole residual interaction.

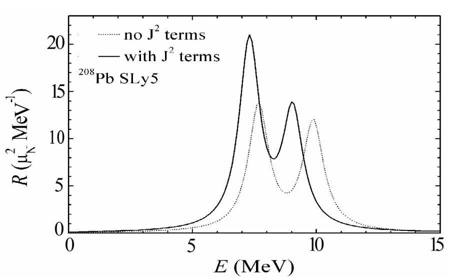

Fig. 1 RPA response functions of ^{208}Pb for M1 mode calculated by the Skyrme HF plus RPA approach with SLy5 interaction.

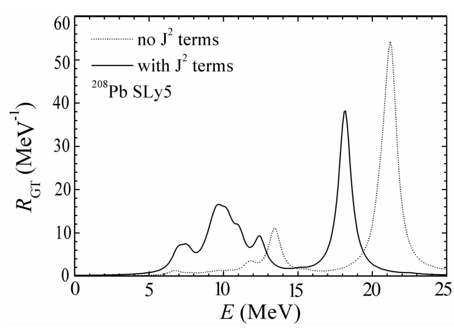

Fig. 2 The same as in Fig. 1 but for GT giant resonance.